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ABSTRACT

This study investigated how social factors affect college students' use of the online registration service that was recently offered in a private university in northern California. During the first year, about 37% of the students who preregistered their courses used the service. The results for the 951 students who registered online indicate that academic and demographic factors affected students' use of the online service. For example, students from certain disciplines (e.g., Pharmacy and International Studies) and higher income families were more likely to use the online service. It is interesting to note that the results do not show a significant impact of gender on the use of online registration. Implications are presented for institutions considering alternative registration methods or the implementation of technological solutions to administrative processes. (Contains 6 tables and 19 references.) (SLD)

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What Social Factors Affect Students' Use of Online Registration: An Exploratory Study

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Abstract

This study investigated how social factors affect college students' use of the online registration service that was recently offered in a private university in Northern California. During the first year, about 37% of the students who pre-registered their courses used the service. The results indicated that academic and demographic factors affected students' use of the online service. For example, students from certain disciplines (e.g. Pharmacy and International Studies) and higher income families were more likely to use the online service. It is interesting to notice that the results did not show a significant impact of gender on the use of online registration. Implications are presented for institutions considering alternative registration methods or the implementation of technological solutions to administrative processes.

What Social Factors Affect Students' Use of Online Registration: An Exploratory Study

The current study focuses on how social factors affect students' use of online registration. The online service was first offered at the university in spring 2001. Using online registration can be viewed as new technology adaptation. However, updated literature in students' new technology adoption is rare. It is worthwhile to investigate how social factors affect college students in adapting the new technology. There are two objectives for this study: reviewing relevant literature of the online registration in the past three decades and examining the impacts of social factors on use of the online service.

Review of Literature

According to the literature, online registration[1] can be divided into three stages of development. The first stage is the 1970s. This is a "developing stage" in which some universities led higher education institutions to experience initial new technology application in administration (Michael, 1976; Chapman & Gambrell, 1976; Brown, 1979; Hengehold & Keim, 1975; Adams, 1974). During this stage, online registration underwent a period of experiments and testing. Online registration was beginning to

be recognized for its operation in assisting university administration.

The second stage refers to the decade of the 1980s. During these years, online registration was widely used by universities across the country. New features in the registration process were added and more experience was summarized (Heard, 1987; Cook & Parker, 1983; Arnett & Posey, 1986; Lonabocker & Long, 1983; Lisker, 1987). This period can be viewed as the "stabilized stage." Cook & Parker (1983) conducted a survey of online registration practices among 66 colleges and universities. They found that online registration had improved academic advising. Lisker summarized that the new technology application had saved time for students, faculty and staff members (1987). Online registration has been clearly confirmed as "a successful approach" (Lonabocker & Long, 1983; Arnett & Posey, 1986).

The third stage includes the 1990s and beyond. This period can be viewed as the "enhancement stage." There have been new ways of exploring online registration such as using web service (Swein, 1997), integration of internet technology into all phases of the education process (Thomas, Carswell & Price, 1998), and getting specific groups of students involved in online registration (Kelly, 1998). Thomas et al. pointed out that the integrative approach has been effective in university administration. The third stage indicates that online

registration has been well developed, looking for new ways to enhance the new technology environment through new technology convergence.

Theoretical Framework & Research Questions

Social cognitive theory (Bandura, 1986) helps explain how human behaviors are affected by both social factors (e.g. family income) and personal factors (e.g. self-concepts). The theory suggests that different social characteristics of students affect how they adapt themselves into the new technology environment. Based on social cognitive theory, the current study is investigating how social variables affect students' use of online registration. The following are the research questions.

1. To what extent do student academic variables impact the use of online registration?
2. To what extent do student demographic variables impact the use of online registration?
3. What are the effects of the academic and demographic variables on the use of online registration?

Methodology

The data were extracted from the university student information system. The dependent variable was the registration method (online vs. walk-in). The independent variables were in

two parts: academic variables and demographic variables. The academic variables included Major, Class, Grade, and Degree Level. The "major" was measured by the college or school a student majored in. The "class" described the students' class level including freshmen, sophomore, junior, senior, and graduate. The "degree level" was measured by two categories: graduate level and undergraduate level. The "grade" was measured by the students' cumulative GPA. The demographic variables included Gender, Age, Ethnicity, and Family Income. The "family income" was a two-category variable including families with income <$90,000 and families with incomes >=$90,000. The data source was the adjusted gross income reported from FAFSA.

Results

To answer research question one, "To what extent do student academic variables impact the use of online registration?", a descriptive analysis was conducted. The results showed that the students who used the online registration were more likely those who majored in pharmacy (39%) and international studies (37%). The students who did not use the online registration were more likely those who majored in music (13%). The Chi-square test showed that the relationship between the registration method and major was significant, χ^2 (6, n=3024)= 43.8, p<0.001. The standardized residuals indicated that the majors of music and

pharmacy most strongly contributed to the significant relationship (Table 1).

Table 1

Relationship between Using Online Registration and Major

	REGISTRATION METHOD		
MAJOR	Walk-in (n=2073)	Online (n=951)	Total (n=3024)
Arts & Sciences (n=1343)			
Row	69%	31%	100%
Column	44%	44%	44%
Std. Residuals	0.0	0.0	
Business (n=494)			
Row	66%	34%	100%
Column	16%	18%	16%
Std. Residual	-0.6	0.9	
Education (n=207)			
Row	74%	26%	100%
Column	75	6%	7%
Std. Residuals	0.9	-1.4	
Engineering (n=345)			
Row	69%	31%	100%
Column	12%	11%	11%
Std. Residuals	0.2	-0.2	
International Studies (n=115)			
Row	63%	37%	100%
Column	3%	5%	4%
Std. Residuals	-0.8	1.1	
Music (n=168)			
Row	87%	13%	100%
Column	7%	2%	6%
Std. Residuals	3.0	-4.4	
Pharmacy (n=352)			
Row	61%	39%	100%
Column	10%	15%	12%
Std. Residuals	-1.8	2.6	
Total			
Row	69%	31%	100%
Column	100%	100%	100%

Table 2 shows the relationship between the registration method and class level. Two hundred and sixty-four seniors (34% of the seniors) and 86 graduate students (41% of the graduate students) used web to register for courses. The Chi-square test showed that the relationship between the registration method and class level was significant, χ^2 (4, n=2964)= 17.2, $p<0.01$. The standardized residuals indicated the graduate class level most strongly contributed to the significant relationship (Table 2).

Table 2

Relationship between Using Online Registration and Class

CLASS	REGISTRATION METHOD Walk-in (n=2037)	Online (n=927)	Total (n=2964)
Freshman (n=564)			
Row	69%	31%	100%
Column	19%	19%	19%
Std. Residual	0.1	-0.1	
Sophomore (n=601)			
Row	73%	27%	100%
Column	22%	18%	20%
Std. Residual	1.2	-1.7	
Junior (n=808)			
Row	70%	30%	100%
Column	28%	26%	27%
Std. Residual	0.6	-0.9	
Senior (n=781)			
Row	66%	34%	100%
Column	25%	29%	26%
Std. Residual	-0.9	1.3	
Graduate (n=210)			
Row	59%	41%	100%
Column	6%	9%	7%
Std. Residual	-1.7	2.5	
Total (n=2964)			
Row	69%	31%	100%
Column	100%	100%	100%

To test the relationship between the registration method and grades, a t-test was conducted. The t value showed a significant relationship between the registration method and students' grades. This finding suggests that grades played a significant role in shaping students to use the online service.

To answer research question two, "To what extent do student demographic variables impact the use of online registration?", a descriptive analysis was conducted. The results showed that students who were from higher income families were more likely to use online registration. About 150 students with family income >=$90,000 (36% of income >=$90K) used the online registration, while 404 students with family income <$90,000 (30% of income<$90K) used the service. Chi-square test shows the relationship between the registration method and family income was significant, χ^2 (1, n=1359)= 5.1, p<0.05 (Table 3).

Table 3

Relationship between Using Online Registration and Family Income

	REGISTRATION METHOD		
FAMILY INCOME	Walk-in (n=1221)	Online (n=551)	Total (n=1772)
Family Income <$90K (n=1359)			
Row	70%	30%	100%
Column	78%	73%	77%
Family Income >=$90K (n=413)			
Row	64%	36%	100%
Column	22%	27%	23%
Total			
Row	69%	31%	100%
Column	100%	100%	100%

Table 4 shows that students with Hispanic and Caucasian ethnicity background were more likely to use the online registration. About 540 Caucasian students (33%) and up to 91 Hispanic students (32%) used the online registration. However, the Chi-square test failed to show a significant relationship between the registration method and the ethnicity background.

Table 4

Relationship between Using Online Registration and Ethnicity

ETHNICITY	REGISTRATION METHOD Walk-in (n=1970)	REGISTRATION METHOD Online (n=906)	Total (n=2876)
Asian/Pacific Islander (n=811)			
Row	70%	30%	100%
Column	29%	27%	28%
African American (n=88)			
Row	77%	23%	100%
Column	3%	2%	3%
Hispanic (n=283)			
Row	68%	32%	100%
Column	10%	10%	10%
Native American (n=33)			
Row	70%	30%	100%
Column	1%	1%	1%
White/Non-Hispanic (n=1661)			
Row	67%	33%	100%
Column	57%	60%	58%
Total (n=2876)			
Row	68%	32%	100%
Column	100%	100%	100%

To test the relationship between the registration method and gender, another Chi-square test was conducted. The statistics showed that there was no significant relationship between the registration method and gender. About 32% of the male students and 31% of the female students used online registration. To test the relationship between the registration method and age, a t-test analysis was conducted. The statistics did not show a significant relationship between the registration method and age (Mean=22.4, SD=6.6).

The results of the descriptive analysis in Tables 1-4 suggested that the variables of major, class level, grade and family income significantly impact the use of online registration. However, it is not clear whether or not the relationships observed above still exist after controlling for the combined effects of these variables. To test the relationships and to answer research question three, "What are the effects of the academic and demographic variables on the use of online registration?", multiple logistic regression analyses were conducted. Logistic regression is used when the dependent variable is dichotomous and the independent variables are continuous, categorical, or both. Logistic regression applies maximum likelihood estimation after transforming the dependent into a logit variable. Table 5 shows the logistic regression coefficients, Wald test, and odds ratio for each of the

predictors. Step 4 yielded the most predictive model. The overall successful classification rate of the model was 69%. Employing a 0.05 criterion of statistical significance, music major, sophomore class level, graduate class level, and family income showed significant partial effects on the registration method. The odds ratios for "sophomore" and "music" indicated that sophomores and music majors were less likely to use the online registration. The odds ratios for "graduate" and "family income" indicated that when holding other variables constant, graduate students were about three times more likely to use the online registration. And students from higher income families (>=$90K) were about one and one third times more likely to use online registration (Table 5).

Table 5

Effects of Social Variables on the Use of Online Registration (Model One)

	Independent Variables	β	Wald χ^2	p	Odds Ratio	Sig
Step 1	Music	-1.13	15.89	0.00	0.32	↓*
	Constant	-0.74	199.02	0.00	0.48	
Step 2	Music	-1.14	16.39	0.00	0.32	↓*
	Sophomore	-0.32	6.40	0.01	0.72	↓*
	Constant	-0.67	128.74	0.00	0.51	
Step 3	Music	-1.17	17.04	0.00	0.31	↓*
	Sophomore	-0.32	6.28	0.01	0.73	↓*
	Family Income	0.29	5.89	0.02	1.34	↑*
	Constant	-0.74	125.10	0.00	0.48	
Step 4	Music	-1.17	16.98	0.00	0.31	↓*
	Sophomore	-0.30	5.64	0.02	0.74	↓*
	Graduate	1.04	4.86	0.03	2.84	↑*
	Family Income	0.29	5.66	0.02	1.33	↑*
	Constant	-0.75	128.33	0.00	0.47	

↓* indicates significant lower probability to use the online registration;
↑* indicates significant higher probability to use the online registration.

To further understand the impacts of "major" and "class" across each individual category, a second model was developed. The odds ratios for the "major" categories showed that, when holding other variables constant, students in international studies and pharmacy were over four times more likely to use online registration, compared to students in music. While, students in engineering and business were about three times more likely to use online registration (Table 6). Although Model one

showed that sophomores were less likely to use online registration, the Wald statistics for the "class" categories in Model Two showed that compared to sophomores, only seniors and graduate students were significantly more likely to use online registration. The odds ratios for "graduate" and "senior" indicated that, compared to sophomores, graduate students were about two and one half times more like to use online registration. While, seniors were about one and one half times more likely to use the service. Again, the odds ratio for "family income" indicated that when holding other variables constant, students from higher income families (>=$90K) were about one and one third times more likely to use online registration.

Table 6 Effects of Social Variables on the Use of Online Registration (Model Two)

	Independent Variables	β	Wald χ^2	p	Odds Ratio	Sig
Step 1	Major					
	Education	1.26	13.24	0.00	3.52	↑*
	Business	1.04	11.17	0.00	2.82	↑*
	Pharmacy	1.33	18.08	0.00	3.79	↑*
	Arts and Sciences	1.07	13.88	0.00	2.92	↑*
	Engineering	0.98	9.49	0.00	2.66	↑*
	International Studies	1.41	16.16	0.00	4.11	↑*
	Constant	-1.87	45.25	0.00	0.15	
Step 2	Major		23.32	0.00		
	Education	1.23	12.41	0.00	3.42	↑*
	Business	1.07	11.87	0.00	2.92	↑*
	Pharmacy	1.40	19.53	0.00	4.05	↑*
	Arts and Sciences	1.10	14.55	0.00	3.01	↑*
	Engineering	0.97	9.26	0.00	2.63	↑*
	International Studies	1.47	17.23	0.00	4.33	↑*
	Class		12.65	0.01		
	Graduate	0.92	4.12	0.04	2.51	↑*
	Senior	0.49	9.74	0.00	1.62	↑*
	Junior	0.19	1.51	0.22	1.21	
	Freshman	0.27	3.09	0.08	1.32	
	Constant	-2.14	51.40	0.00	0.12	
Step 3	Major		23.60	0.00		
	Education	1.26	12.99	0.00	3.53	↑*
	Business	1.08	12.11	0.00	2.96	↑*
	Pharmacy	1.41	19.69	0.00	4.08	↑*
	Arts and Sciences	1.13	15.26	0.00	3.10	↑*
	Engineering	1.00	9.91	0.00	2.73	↑*
	International Studies	1.50	17.87	0.00	4.46	↑*
	Class		12.43	0.01		
	Graduate	0.90	3.92	0.05	2.46	↑*
	Senior	0.49	9.79	0.00	1.63	↑*
	Junior	0.19	1.60	0.21	1.21	
	Freshman	0.25	2.58	0.11	1.29	
	Family Income	0.30	5.96	0.01	1.35	↑*
	Constant	-2.24	54.85	0.00	0.11	

Discussion

The study did not find significant gender impact on using the online service. Though the finding may be a bit surprising, it is consistent with the result found by Sax, Astin, Korn, and Mahoney (2000). Their study indicated a gender gap was narrowing in computer use. It is possible that the narrowing gap between gender differences in using computer technology could be reflected in our sample of online registration investigation. This study also found that the students' majors and classes affected the use of the online registration. In addition, family income impacted the use of online registration. This study suggests that social factors, such as academic emphasis and family income play a role in shaping students' new technology adoption. The findings are important but with some limitations. This is because the results of the current study were based on one institution's experience and the measurement of the academic and demographic variables were limited by student registration data. To better understand the impacts of social variables on the use of online registration and other new technologies, more studies need to be conducted across institutions and across different new technology adoption behaviors.

Implications

The research results suggest that academic and demographic variables affect students' use of online registration. These findings should help inform university administrators of the impact of students' social factors on their adoption of the online service. Based on Pacific's experience, some suggestions are offered for those who are planning to launch an online registration service in their universities.

Pacific's experience suggests that an "online registration 101 training workshop" be conducted for faculty advisors. The workshop could make online registration more effective and efficient. The training should help the advising process because faculty advisors are critical in helping students with their registration process.

Pacific's experience also suggests that Web Registration Card is useful in ensuring that students obtain their advisors' approval for course selection during online registration. The cards are issued to faculty advisors in each academic department for distribution. Web Registration Cards could ensure that the traditional advising process remain intact. The method of assigned registration times may also aid institutions that have limited server capacity. It can be quite a bandwidth to have large numbers of students attempting to find that perfect class schedule in the opening minutes of the registration process.

In addition, Pacific's experience suggests that university administrators take measures to reduce students' uncertainty and enhance students' self-efficacy in learning new technology. Creative methods can be used to promote a better understanding of the online registration procedures and its advantages. A better understanding of the online registration should boost faculty and students' self-confidence in using computer technology. Also frequent online registration demonstrations could help students realize some key characteristics of using the online service: simplicity, effectiveness, and convenience.

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Note:

[1]Online registration in the literature review refers to various methods through which a registration can be completed, such as, mainframe computer, telephone, and web.

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